REMARKS

This application contains claims 1-11, 13 and 19-65. Claims 1, 19, and 24 are hereby amended. No new matter has been introduced. Reconsideration is respectfully requested.

Claims 1-31 were rejected under 35 U.S.C. 101 for being directed to non-statutory subject matter. The Examiner suggested in the present Official Action (page 14) that the rejection could be overcome by adding the term "computerized" as a modifier in the preamble of these claims. Applicant has amended independent claims 1, 19 and 24 accordingly. Applicant believes this amendment should be entered after the final rejection in this case, because it will put the claims in better condition for allowance or appeal, and should not require any further search or consideration by the Examiner.

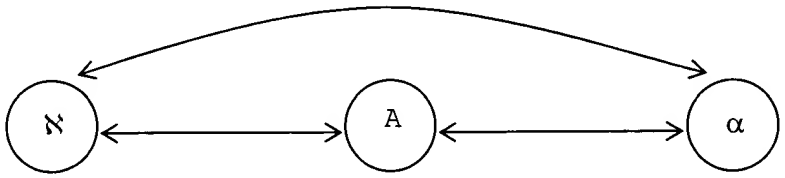
Claims 1-11, 13 and 19-65 were rejected under 35 U.S.C. 102(b) over Mackworth ("Consistency in Networks of Relations"). Applicant respectfully traverses this rejection.

In applying this rejection, the Examiner stated (page 17 in the Official Action) that "The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art." Applicant does not question this tenet of MPEP, but notes the importance of reasonableness in its application, as emphasized by underlining in the original case from which phrase is taken [*In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir. 1983), cited in MPEP 2111.01].

Claim 1 recites the step of "assembling the variables in a hierarchy." In response to the previous Official Action, Applicant cited a dictionary definition of hierarchy as "the arrangement of objects, elements, or values in a graduated series" or "a series of objects, elements or values so arranged," i.e., arranged in a graduated series. With regard to claim 1, the Examiner stated, "From the applicant's definition of hierarchy, anything assembled can represent a hierarchy so long as it is so arranged. Hence even if the subscripts maybe arbitrary, a hierarchy is established since the implementation is serial." It would appear from the

Examiner's response that any series - even one whose order is completely arbitrary - is a hierarchy. The Examiner appears to have overlooked the term "graduated," which means (again quoting *Webster*): "divided into grades, steps, or successive levels." There are no "grades, steps, or successive levels" in an arbitrary assignments of subscripts, as used by Macworth. In giving such an over-broad interpretation to the term "hierarchy," the Examiner has deprived the term of any meaning at all, and has thus gone outside its "reasonable sense."

To illustrate graphically this over-stretching of the bounds of claim terminology, Applicant notes that in rejecting claim 2, the Examiner stated that "graphs have nodes and linkages and are axiomatically hierarchical." This categorical statement is simply wrong. Consider the graph below, which is part of a system of graphs representing transliteration between English, Hebrew and Greek characters. (This graph indicates that the letters "A", "aleph" and "alpha" are to be transliterated into one another.) The graph has three nodes, linked by edges, but it clearly has no hierarchy. Graphs are hierarchical only when the nodes and/or edges are arranged in a graduated series.



Returning now to claim 1, this claim recites a method for testing a system that is based on building a network of hyper-arcs representing a set of relations among variables. The variables linked by each of the hyper-arcs are assembled in a hierarchy based on the relation corresponding to the hyper-arc. The input domains of the variables in the hierarchy are reduced in order to determine output domains consistent with the relations, and thus to determine the values of the inputs to be made to the system under test.

In rejecting this claim, the Examiner made reference to Mackworth's "REVISE" procedure. Applicant pointed out, in response to the previous Official Action in this case, that the REVISE procedure does not involve any sort of

hierarchy, notwithstanding the arbitrary subscripts used to label the variables in the procedure. The difference between this sort of subscript ordering and the "hierarchy" recited in claim 1 is further clarified by the explanation above.

In the Examiner's Response to Arguments in the present Official Action, the Examiner went on to point out that "predicate ordering is explicitly established by Mackworth" on page 101, lines 17-18, which states: "The binary predicate *P* denotes strict lexicographic ordering of its arguments." This statement, however, gives no more than an arbitrary logical rule by which Mackworth defines the predicates in the sample network that he shows in his Fig. 1. This rule states, for example, that $P(a,b)$ = T, while $P(b,a)$ = F. The sole purpose of this rule is to illustrate the inefficiency of existing methods for finding inconsistencies in constraint networks. It has nothing to do with assembling the variables for each of a network of hyper-arcs in a hierarchy or reducing the input domains of the variables in the hierarchy, as recited in claim 1.

Thus, Applicant respectfully maintains that claim 1 is patentable over Mackworth. In view of the patentability of claim 1, claims 2-11 and 13, which depend from claim 1, are also believed to be patentable.

Claim 19 recites a method for testing a system based on building a network of hyper-arcs representing a set of constraints among variables that are characteristic of inputs to the system. The constraints include a relation among at least three of the variables. One of the hyper-arcs corresponds to this relation.

In rejecting this claim, the Examiner wrote simply: "regarding three variables, Mackworth, p 104, l 18-24; such is D_i, D_j, D_k and related variables." As pointed out in response to the previous Official Action, however, the mere fact that Mackworth describes systems of three or more variables does not mean that he teaches or suggests "a relation among at least three of the variables" or "one of the hyper-arcs corresponding to the relation among the at least three of the variables." These limitations are recited explicitly in claim 19. Therefore, Applicant cannot understand the Examiner's comment in the present Response to Arguments that "Limitations appearing the specification but not recited in the claim are not read into

the claim." Applicant has put forth nothing more than the claim limitations themselves.

Mackworth discloses only unary predicates ($P_j(y)$) and binary predicates (P_{ij}-(x,y)). His arcs relate pairs of variables, for example: "For each arc from node i to node j corresponding to $P_{ij}(i<j)$..." (page 101, lines 10-11). Mackworth neither teaches nor suggests the use of relations or hyper-arcs involving at least three variables. Therefore, claim 19 is believed to be patentable over Mackworth, as are claims 20-23, which depend from claim 19.

Claim 24 also recites a method for testing a system based on building a network of hyper-arcs representing a set of constraints among variables that are characteristic of inputs to the system. In this case, the constraints include one or more relations defined as a combination of operators, and a network of hyper-arcs is built to represent the set of constraints.

In rejecting claim 24, the Examiner asserted that the use of constraints comprising one or more relations defined as a combination of operators is described by Mackworth on page 104, lines 2-18. As noted in Applicant's response to the previous Official Action, the cited passage makes no mention or suggestion of a relation between variables defined as a combination of operators, nor is there any such suggestion elsewhere in Mackworth of defining a relation in this manner.

The Examiner's Response to Arguments in the present Official Action does not clarify the situation. The Examiner again makes reference to limitations appearing in the specification but not recited in the claim, but Applicant's arguments referred only to limitations in the claim itself. The Examiner does not identify where Mackworth teaches a "relation defined as a combination of operators," but states only that "The combination of operators comes forth from the Boolean procedure." The source for this assertion is unclear, but it can be stated unequivocally that the relations between variables in the procedures listed by Mackworth on page 104 are exclusively of the form $P_{ij}(x,y)$, i.e., simple logical operators between two variables.

As noted previously by the Applicant, MPEP 2131 states:

> TO ANTICIPATE A CLAIM, THE REFERENCE MUST TEACH EVERY ELEMENT OF THE CLAIM... "The identical invention must be shown in as complete detail as is contained in the... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

An unsupported assertion that the combination of operators somehow "comes forth" from Mackworth, without an explanation of how or where this "coming forth" occurs, does not meet the burden of MPEP 2131. Therefore, claim 24 is believed to be patentable over Mackworth, as are claims 25-31, which depend from claim 24.

Claims 32, 50 and 55 are independent apparatus claims, which recite apparatus for solving a constraint satisfaction problem based on principles similar to the methods of claims 1, 19 and 24, respectively. These claims were rejected with reference to the passages in Mackworth cited above, as well as other passages relating to path consistency (pages 107-109). Therefore, for the reasons explained above with reference to claims 1, 19 and 24, independent claims 32, 50 and 55 are believed to be patentable over the cited art, as are dependent claims 33-49, 51-54 and 56-62.

Claims 63-65 are independent product claims, which recite computer software for solving a constraint satisfaction problem. These claims are likewise based on principles similar to the methods of claims 1, 19 and 24, respectively, and were rejected on similar grounds to the apparatus claims. Thus, for the reasons explained above, claims 63-65 are believed to be patentable over the cited art.

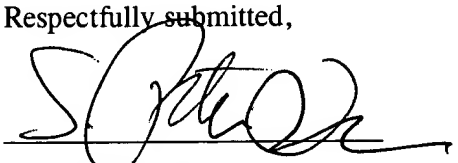
Although Applicant has not specifically argued the patentability of the dependent claims, these dependent claims are believed to recite independently-patentable subject matter, notwithstanding the patentability of the independent claims. Arguments with respect to the dependent claims have been omitted in the interest of brevity.

Applicant believes the amendments and remarks presented hereinabove to be fully responsive to all of the objections and grounds of rejection raised by the Examiner. In view of these amendments and remarks, Applicant respectfully

submits that all of the claims in the present application are in order for allowance. Notice to this effect is hereby requested.

Date: April 20, 2005

Respectfully submitted,



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